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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/935,493 | 08/23/2001 | Richard E. Smalley | 11321-P034US | 1436 |

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EXAMINER

TSOY, ELENA

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1762

DATE MAILED: 10/03/2003

2

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary.

Application No.

09/935,493

Applicant(s)

SMALLEY ET AL.

Examiner

Elena Tsoy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 and 28-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-15, 17-19, 24, 27 is/are rejected.
- 7) ☒ Claim(s) 16, 20-23, 25 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other:

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-10, drawn to a method for associating a polymer with sidewalls of a plurality of individual single-wall carbon nanotubes, classified in class 427, subclass 212.
 - II. Claims 11-27, drawn to a method for making polymer-coated single-wall nanotubes, classified in class 427, subclass 212.
 - III. Claims 28-46, drawn to a method for making polymer-coated aggregates of single-wall nanotubes, classified in class 427, subclass 212.

Distinctness

The inventions are distinct, each from the other because:

2. Inventions I, II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects because in contrast to inventions II and III, a method of invention I comprises adding salt, and invention II is directed to polymer coating of individual nanotubes, whereas invention III is directed to polymer coating of aggregates of individual nanotubes.
3. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II or Group III, restriction for examination purposes as indicated is proper.

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4. During a telephone conversation with Ross Spencer Garsson on September 11, 2003 a provisional election was made without traverse to prosecute the invention of Group II, claims 11-27. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-10, 29-46 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
5. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).
6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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8. **Claims 11, 15** are rejected under 35 U.S.C. 102(b) as being anticipated by Coleman et al (Physical Review B, 58, R7492-R7495).

Coleman et al disclose a method for making polymer-coated carbon nanotubes comprising dispersing a soot containing amorphous carbon, nanoparticles carbon and nanotubes (consisting of **one** (single-wall nanotubes) *or* more sheets of graphene wrapped around each other) and a polymer in a solvent by mixing and sonicating (See page 1).

9. **Claims 11, 13, 15, 24** are rejected under 35 U.S.C. 102(a) as being anticipated by Davey et al (EP 949199).

Davey et al disclose a method for making polymer-coated carbon nanotubes comprising dispersing nanotube soot and a polymer in a solvent by mixing and sonicating (See Abstract, [0021]-[0024], [0050]-[0052]).

As to claims 13, 24, the polymer-coated carbon nanotubes can be blended with other plastics (See [0059], [0060]) in injection moulding (See [0060], line 23).

10. **Claims 11, 12, 14, 15** are rejected under 35 U.S.C. 102(e) as being anticipated by Kuper (US 2002/0092613).

Kuper discloses a method for making polymer-coated carbon nanotubes comprising adding a polymer or a surfactant to a suspension of purified SWNT in a liquid medium (solvent) (See [0024], [0027], [0028]).

11. **Claims 11, 12, 15, 27** are rejected under 35 U.S.C. 102(a) as being anticipated by Bower et al (EP 989579).

Bower et al disclose a method for fabricating devices containing adherent carbon nanotubes (See [0018]) comprising mixing purified SWNT or MWNT (See [0018], [0020],

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column 13, line 25) with solvents and polymers to form a solution or slurry (See [0028], [0029]), then applying the mixture by e.g. spraying to a substrate while applying an electric field and/or magnetic field, so that at least 50 vol.% of the nanotubes of the film are aligned in substantially the same direction (See claim 15; page 6, column 1, lines 38-40; column 2, lines 37-43, 56).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 14, 18, 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Coleman et al (Physical Review B, 58, R7492-R7495) or Davey et al (EP 949199) or Kuper (US 2002/0092613).

Coleman et al/ Davey et al/Kuper, as applied above, fail to teach that the polymer and the plurality of individual single wall carbon nanotubes are added to the solvent sequentially (Claim 14); the concentration of single-wall carbon nanotubes in the solvent is between about 0.1 grams/liter and about 5 grams/liter (Claim 18) or between about 1.0 percent and about 5.0 percent by weight (Claim 19).

As to (i), it is held that sequence of adding ingredients is obvious absent a showing of criticality. In re Gibson 5 USPQ 231, 232 (CCPA 1930).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added a polymer and single wall carbon nanotubes in a method of Coleman et

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al/ Davey et al/Kuper sequentially to a solvent since it is held that sequence of adding ingredients is obvious absent a showing of criticality.

As to (ii), it is held that concentration limitations are obvious absent a showing of criticality. *Akzo v. E.I. du Pont de Nemours* 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claims 18, 19) in a method of Coleman et al/Davey et al/Kuper through routine experimentation in the absence of a showing of criticality.

14. **Claims 11, 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al (Chem. Phys. Letters, 318 (200) 505-510).

Jin et al disclose a method for making polymer-coated carbon nanotubes comprising dispersing powder of carbon nanotubes and a polymer in a solvent by mixing and sonicating (See page 2, 2.2). Jin et al show that SWNT has the same poor solubility as MWNT in most solvents (See page 1). However, Jin et al do not expressly show that SWNT can be treated using the same method to obtain stable solutions.

Considering the fact that SWNT surface is substantially identical to that of MWNT, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have treated SWNT using the same method as for MWNT with the expectation of providing the desired stable solutions containing SWNT since Jin et al show that SWNT has the same poor solubility as MWNT in most solvents.

15. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuper (US 2002/0092613).

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Kuper, as applied above, fails to teach that the solvent further contains a surfactant, i.e. both polymer and surfactant are used for treating SWNT.

It is held that it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980). See also In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960); and Ex parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used combination of polymer and surfactant for adding to a suspension of SWNT in a method of Kuper since Kuper teaches that either one can be used for the same purpose.

Allowable Subject Matter

16. **Claims 16, 20-23, 25, 26** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

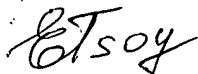
Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is (703) 605-1171. The examiner can normally be reached on Mo-Thur. 9:00-7:30, Mo-Thu.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Elena Tsoy
Examiner
Art Unit 1762

September 23, 2003